VOAs as chiralizations of Nakajima quiver varieties from 3D SQFTs

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Abstract:

Relations between quantum field theories and vertex operator algebras (VOAs) have proven ubiquitous. I will discuss one such instance, where VOAs arise on the boundary of topologically twisted 3d supersymmetric quantum field theories. These VOAs are defined from twisted non-Abelian quiver gauge theories by restricting to the boundary sector and performing a BRST reduction. The quiver description plays a key role, with parallels between the geometry of the associated quiver variety and structures of the corresponding VOA. There are two related perspectives: i) physically, BRST closed operators allow to construct an explicit homomorphism from affine W-algebras into the H-twist VOAs of particular quiver gauge theories, while ii) mathematically, the VOAs are defined as a chiralization of an extended quiver variety. The latter point of view is particularly powerful as it allows to implement a reduction procedure for the quiver diagrams, which translates to free-field realisations when lifted to the VOAs.